On A Simple Recurrence In the Accelerated 3x + 1 Minimum-Inverse Problem.

The aim of this talk is to discuss a simple recurrence within the Accelerated 3x + 1 Minimum-Inverse Map: we will consider the iterates of the function

\[ F(3k + t) = \begin{cases} 
4k + 1, & t = 1 \\
2k + 1, & t = 2 
\end{cases} \]

on the set \( \mathbb{Z} \setminus 3\mathbb{Z} \) where the argument \( 3k + t \) is an odd integer.

The talk will analyze the structural properties of rational expressions of the form

\[ \sum_{0 \leq u < \tau} 3^u 2^{a(u)} \]

\[ \frac{3^{\tau} - 2^{a(\tau)}}{3^{\tau} - 2^{a(\tau)}} \]

where the exponents \( \{a(u)\}_{u=0}^{\tau} \) are non-negative integers; such rationals naturally arise when analyzing the functional orbits of \( F \). This talk will highlight a simple recurrence on the set \( \{0, 1, 2, 3\} \) for generating the 3-adic canonical representations of such rational expressions; not only does this recurrence expedite the computations of such expressions when \( \tau \gg 1 \), but it also reveals a simple and deep connection between all of the iterate values within a functional orbit of \( F \). (Received September 10, 2015)